

PATENT COOPERATION TREATY

PCT

INTERNATIONAL PRELIMINARY REPORT ON PATENTABILITY

(Chapter II of the Patent Cooperation Treaty)


(PCT Article 36 and Rule 70)

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| Applicant's or agent's file reference P-2003-011WO | | FOR FURTHER ACTION | | See Form PCT/PEA/416 |
| International application No. PCT/DK2004/000276 | | International filing date (day/month/year) 22.04.2004 | | Priority date (day/month/year) 28.04.2003 |
| International Patent Classification (IPC) or national classification and IPC H04R1/28 | | | | |
| Applicant OTICON AS et al | | | | |
| <p>1. This report is the international preliminary examination report, established by this International Preliminary Examining Authority under Article 35 and transmitted to the applicant according to Article 36.</p> <p>2. This REPORT consists of a total of 6 sheets, including this cover sheet.</p> <p>3. This report is also accompanied by ANNEXES, comprising:</p> <p>a. <input checked="" type="checkbox"/> sent to the applicant and to the International Bureau) a total of 2 sheets, as follows:</p> <p><input checked="" type="checkbox"/> sheets of the description, claims and/or drawings which have been amended and are the basis of this report and/or sheets containing rectifications authorized by this Authority (see Rule 70.16 and Section 607 of the Administrative Instructions).</p> <p><input type="checkbox"/> sheets which supersede earlier sheets, but which this Authority considers contain an amendment that goes beyond the disclosure in the international application as filed, as indicated in item 4 of Box No. I and the Supplemental Box.</p> <p>b. <input type="checkbox"/> (sent to the International Bureau only) a total of (Indicate type and number of electronic carrier(s)) , containing a sequence listing and/or tables related thereto, in computer readable form only, as indicated in the Supplemental Box Relating to Sequence Listing (see Section 802 of the Administrative Instructions).</p> | | | | |
| <p>4. This report contains indications relating to the following items:</p> <p><input checked="" type="checkbox"/> Box No. I Basis of the opinion</p> <p><input type="checkbox"/> Box No. II Priority</p> <p><input type="checkbox"/> Box No. III Non-establishment of opinion with regard to novelty, inventive step and industrial applicability</p> <p><input type="checkbox"/> Box No. IV Lack of unity of invention</p> <p><input checked="" type="checkbox"/> Box No. V Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement</p> <p><input type="checkbox"/> Box No. VI Certain documents cited</p> <p><input checked="" type="checkbox"/> Box No. VII Certain defects in the international application</p> <p><input checked="" type="checkbox"/> Box No. VIII Certain observations on the international application</p> | | | | |
| Date of submission of the demand 17.02.2005 | | Date of completion of this report 08.06.2005 | | |
| Name and mailing address of the international preliminary examining authority:  European Patent Office D-80298 Munich Tel. +49 89 2399 - 0 Tx: 523656 epmu d Fax: +49 89 2399 - 4465 | | Authorized Officer Peirs, K Telephone No. +49 89 2399-5862 | | |



**INTERNATIONAL PRELIMINARY REPORT
ON PATENTABILITY**

International application No.
PCT/DK2004/000276

Box No. I Basis of the report

1. With regard to the **language**, this report is based on the international application in the language in which it was filed, unless otherwise indicated under this item.
- ☐ This report is based on translations from the original language into the following language , which is the language of a translation furnished for the purposes of:
- ☐ international search (under Rules 12.3 and 23.1(b))
 - ☐ publication of the international application (under Rule 12.4)
 - ☐ international preliminary examination (under Rules 55.2 and/or 55.3)
2. With regard to the **elements*** of the international application, this report is based on *(replacement sheets which have been furnished to the receiving Office in response to an invitation under Article 14 are referred to in this report as "originally filed" and are not annexed to this report):*

Description, Pages

1-6 as originally filed

Claims, Numbers

10, 11 as originally filed
1-9 filed with telefax on 17.02.2005

Drawings, Sheets

1/6-6/6 as originally filed

- ☐ a sequence listing and/or any related table(s) - see Supplemental Box Relating to Sequence Listing

3. ☒ The amendments have resulted in the cancellation of:
- ☐ the description, pages
 - ☒ the claims, Nos. 3, 9
 - ☐ the drawings, sheets/figs
 - ☐ the sequence listing (*specify*):
 - ☐ any table(s) related to sequence listing (*specify*):
4. ☐ This report has been established as if (some of) the amendments annexed to this report and listed below had not been made, since they have been considered to go beyond the disclosure as filed, as indicated in the Supplemental Box (Rule 70.2(c)).
- ☐ the description, pages
 - ☐ the claims, Nos.
 - ☐ the drawings, sheets/figs
 - ☐ the sequence listing (*specify*):
 - ☐ any table(s) related to sequence listing (*specify*):

* If item 4 applies, some or all of these sheets may be marked "superseded."

**INTERNATIONAL PRELIMINARY REPORT
ON PATENTABILITY**

International application No.
PCT/DK2004/000276

Box No. V Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement

1. Statement

| | | |
|-------------------------------|-------------|-----|
| Novelty (N) | Yes: Claims | 1-9 |
| | No: Claims | |
| Inventive step (IS) | Yes: Claims | 1-9 |
| | No: Claims | |
| Industrial applicability (IA) | Yes: Claims | 1-9 |
| | No: Claims | |

2. Citations and explanations (Rule 70.7):

see separate sheet

Box No. VII Certain defects in the international application

The following defects in the form or contents of the international application have been noted:

see separate sheet

Box No. VIII Certain observations on the international application

The following observations on the clarity of the claims, description, and drawings or on the question whether the claims are fully supported by the description, are made:

see separate sheet

Re Item V

**Reasoned statement with regard to novelty, inventive step or industrial applicability;
citations and explanations supporting such statement**

1. Reference is made to the following documents:
D1: US-A-4 677 675 (KILLION MEAD C ET AL) 30 June 1987 (1987-06-30)
D2: PATENT ABSTRACTS OF JAPAN vol. 0061, no. 51 (E-124), 11 August 1982
(1982-08-11) & JP 57 075100 A (SATO YASUO), 11 May 1982 (1982-05-11)
D3: GB-A-2 253 076 (LOTUS CAR) 26 August 1992 (1992-08-26)
D4: US-A-3 019 306 (WEISS ERWIN M) 30 January 1962 (1962-01-30)
D5: US-A-5 434 924 (JAMPOLSKY ARTHUR) 18 July 1995 (1995-07-18)
2. The application relates to a microphone which is less sensitive to ultrasound.
- 3.1 The document D1 is regarded as being the closest prior art to the subject-matter of independent claims 1 (apparatus) and 6 (apparatus).

This document shows a microphone with an inlet for directing sounds (Fig. 2, acoustic coupler 10) from the surroundings to an active element (col. 5, l. 10 - col. 6, l. 11), whereby the inlet comprises a first tube part (Fig. 2, tube 16 and passage 26) and a cavity (Fig. 2, chambers 25 and 32 and passage 33) connected to the first tube part, whereby the cavity is dimensioned to dampen high frequencies (Fig. 8 and col. 6, l. 31-50).

- 3.2 The microphone of claim 1, resp. the inlet structure of claim 6, differs from the microphone, resp. the inlet structure, of D1 in that the claimed cavity is shaped as a second tube part with a length which varies slightly with the cross section of the second tube part.
- 3.3 The subject-matter of claims 1 and 6 is therefore new, Art. 33(2) PCT.
- 3.4 The problem solved by the present application can be formulated as how to provide a configuration which dampens a broader range of (ultrasonic) frequencies (see also description p. 2, l. 27-33).

3.5 The solution which is specified in claims 1 and 6 in order to solve this problem is inventive, Art. 33(3) PCT, for the reason that none of the documents cited in the international search report points in the direction of combining the features as mentioned in point 3.2. In particular:

- a. From D1 itself, there is no motivation to provide the cavity consisting of chambers 25 and 32 and passage 33 (see Fig. 2) with a length which varies slightly over the cross section.
- b. The teaching of the other documents cited in the international search report cannot be combined with D1 to render the subject matter of the independent claims obvious:

In D2 (abstract), high-frequency sound and ultrasound is dampened, but this dampening is done using special dampening materials and electronic means.

In D3 (abstract; Fig. 2, cavity 10 and movable wall 7; p. 10, l. 5-11), a tunable acoustic resonator is disclosed, in which the length of a dampening cavity is changed according to a selected frequency which is to be dampened. However, this length, though variable, is constant over the cross section of the cavity.

In D4 (col. 6, l. 27-34) a method to reduce acoustic feedback in general by means of a quarter-wave acoustic trap is disclosed. No hint at a cavity with a length slightly varying over the cross section is provided.

In D5 (col. 2, l. 25-34; col. 13, l. 23 - l. 44), an inset consisting of several fixed chambers is provided in a hearing aid to enable the wearer to exclude some unwanted sounds. In this document, the chambers have a constant length over the cross section.

- c. Combination of any of the documents cited in the international search report and general knowledge does not lead to the subject matter of the independent

claims either.

- 3.6 The claims 2-5 and 7-9 are dependent on respectively claims 1 and 6 and therefore also fulfil the requirements of the PCT with respect to novelty and inventive step.
4. All claims fulfill the requirement with respect to industrial applicability, Art. 33(4) PCT, for obvious reasons.

Re Item VII: Form or content of the application

Contrary to the requirements of Rule 5.1(a)(ii) PCT, the relevant background art disclosed in the documents D1 and D3 is not mentioned in the description, nor are these documents identified therein.

The features of the claims are not provided with reference signs placed in parentheses (Rule 6.2(b) PCT).

Re Item VIII: Reasoned statement with regard to clarity, Art. 6 PCT.

Independent claim 1 comprises all the features of independent claim 6 and is therefore not appropriately formulated as a claim dependent on the latter (Rule 6.4 PCT).

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CLAIMS

- 5 1. Microphone with housing and an active element inside the housing for converting sound energy into electric energy whereby an inlet is provided for directing sound energy from the surroundings to the active element, whereby the inlet comprises a first tube part and a cavity in connection with the first tube part, whereby the cavity is dimensioned to dampen ultrasonic frequencies, and where the cavity is shaped as a
- 10 second tube part with a length dimension L which varies slightly with the cross section of the second tube part.
2. Microphone as claimed in claim 1, whereby the cavity has a dimension L which is around $\frac{1}{4}$ of the wavelength of the ultrasonic frequency to be damped.
- 15 3. Microphone as claimed in claim 2, whereby the second tube part is curved, and is arranged in a plane essentially perpendicular to the first tube part.
4. Microphone as claimed in any of claim 2 or 3, whereby the cavity or second tube part
- 20 is arranged in close proximity of the microphone.
5. Hearing aid with a microphone as claimed in any of claims 1-4.
6. Inlet structure for a microphone, comprising a first tube part and a cavity in
- 25 connection with the first tube part, whereby the cavity is dimensioned to dampen ultrasonic frequencies and where the cavity is shaped as a second tube part with a length dimension L which varies slightly with the cross section of the second tube part.
- 30 7. Inlet structure for a microphone as claimed in claim 6, whereby the cavity has a dimension L which is around $\frac{1}{4}$ of the wavelength of the ultrasonic frequency to be damped.

PCT/DK2004/000276 amended claims. Substitute sheet.

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8. Inlet structure for a microphone as claimed in claim 7, whereby the second tube part is curved, and is arranged in a plane essentially perpendicular to the first tube part.

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9. Inlet structure for a microphone as claimed in any of claims 7 or 8 whereby the cavity or second tube part is arranged in close proximity of the microphone.

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